**I. Need for the Project**

The University of West Alabama is located in Sumter County, Alabama, which has a total population of 13,266 (*Source: U.S. Census Bureau, Census 2010*). UWA, founded in 1835, is a regional state-supported university offering programs and services that are shaped by its primary purpose of serving students in Sumter and the surrounding five counties from which 27% (1,373) of its enrollment comes. Within this primary service area, UWA is the only four-year state institution, other than The University of Alabama at Tuscaloosa, which has goals completely different from those of a regional institution. UWA is composed of the Division of Nursing, the Colleges of Liberal Arts, Education, Business and Commerce, and Natural Sciences and Mathematics, and the School of Graduate Studies. The University’s liberal admissions policy, small enrollment, and affordable tuition serve to attract a large population of students from low-income families.

***a. The magnitude of the needs for the services to be provided or the activities to be carried out by the proposed project.***

Twenty-seven percent of UWA’s fall 2010 undergraduate enrollment (1,373 students) resided in Sumter County and the five neighboring counties of Greene, Marengo, Hale, Choctaw, and Pickens. This region in west Alabama, known as the Black Belt, is widely regarded as one of the poorest and most rural regions of the state and of the nation. These 1,373 students are members of communities where educational deprivation and an unskilled labor force have created an economically stagnant area in Alabama. There is clear evidence that poverty levels in the six counties exceed Alabama’s poverty rate of 15.9%, at the least by 6.7% in Marengo County and at most by 17% in Sumter County (U.S. Census, 2008).

The Center for Rural Alabama’s May 2009 publication *Lessons Learned from Rural Schools* examines the environments of students’ home and school lives in an attempt to determine the extent of the relationship between poverty and educational attainment. Their research suggests that while poverty persists because of many factors, such as the shortage of jobs, lack of qualified workforce, lack of a diversified economy, and lack of infrastructure, often these deficits are caused and enhanced by the lack of quality education available to students enrolled in primary and secondary schools.

In the UWA service area, 37% of children live in poverty, surpassing the state rate of 25%. The school systems of these counties show a direct link between poverty and low levels of educational achievement. Being eligible for Free or Reduced Price School Lunches (FRPSL) is an indicator of poverty. School Report Cards published by The Alabama State Department of Education (ALSDE) show the percentages of students eligible for FRPSL for 2009-2010 for each system as follows: Linden City schools at 91.6%, Marengo County at 81.8%, and Sumter County at 92.6%. The rates for students enrolled in Demopolis are somewhat lower at 54%, but only Demopolis High School falls under 50%. This problem is inextricably connected to family and environment. The demographics of UWA’s rural service area perpetuates the cycle of ill-prepared high school graduates. As the rates of underprivileged students in these counties are so high, further handicapping them with teachers who are not highly-qualified, only inhibits their performance in school. Many students are children of parents without a higher education or are victims of the same systems themselves. Without access to resources that allow students to overcome social and economic boundaries, the cycle of poverty and poor education will continue through the coming generations.

The **Global Resources for Experiences in Authentic Teaching: Modeling Innovation and Demonstrating Success Project (GREAT MINDS)** will change teacher preparation and quality in the STEM areas throughout our region by providing faculty and students access to quality preparation, ongoing professional development activities and mentoring relationships to strengthen early teaching experiences. The integration of current research related to first generation college students and minority students utilizing mentoring, hands-on, and a discovery-based learning approach will improve student performance and retention by strengthening foundations in subject-area content knowledge and research-based pedagogy by reinforcing them with experiential activities and mentoring strategies.

The program will impact the number and quality of STEM teachers in an area of Alabama plagued with low student achievement scores, poverty, uncertified teachers, and high rates of teacher turnover. Furthermore, the GREAT MINDS project will increase the number of Black Americans in STEM teacher education. Through research-based experiences, participants will take part in hands-on authentic learning experiences based on current research ideologies. The ongoing recruitment and support system will strengthen partnerships with school districts thus building networks to improve the quality of STEM teaching in the targeted area and in the nation. The GREAT MINDS project will provide secondary schools with skilled, experienced STEM teachers capable of exposing younger students to innovative learning methods and the use of technology thus encouraging confidence and critical thinking, better-preparing students for college level experiences.

1. ***The extent to which the proposed project will focus on serving or otherwise addressing the needs of disadvantaged individuals.***

Black American students entering UWA as freshmen lack the motivation and self-esteem to become successful. Students from the poor areas targeted for this project enter college feeling inadequate. Significant to the program is preparing teachers for the future in order to *break the cycle of low performing schools in poverty-ridden areas.* The targeted area has suffered from inadequate schools for decades. In addition to providing services to disadvantaged, low-income, rural Black Americans, the project will benefit industries, health, and educational institutions by preparing minorities in STEM areas. The project directly addresses the purpose of the PBI program by strengthening the College of Education (largest undergraduate college), specifically teacher education, while increasing the number of Black students who enroll in teacher education, complete the bachelor’s degree, teacher certification, and highly qualified designation. The students will have the opportunity to learn up-to-date technology through campus learning sessions and informal get-togethers. By preparing capable students to become master teachers and return to their home schools, the shortage of certified, capable teachers is addressed. More importantly, the quality of classroom instruction is improved. Outstanding teachers can impact the quality of education within given schools. The overarching outcome will be improved schools which support into the community and economic development.

1. ***The extent to which specific gaps or weaknesses in services, infrastructure, or opportunities have been identified and will be addressed by the proposed project, including the nature and magnitude of those gaps or weaknesses.***

School systems across the Black Belt Region are characterized by high a percentage of students on the free lunch program, high dropout rates, low expenditures per student, low test scores, high rates of uncertified teachers, low passing rates on the Graduation Exam, low ACT scores, and low percentages of students attending postsecondary institutions. The significance of the data represents an ongoing cycle of the poor educational standards in which students have no exposure to a quality education, thus the few who complete college and return do not change the existing norm established decades ago.

Identification of Best Practices for STEM Education The Black Belt Region faces a serious lack of qualified STEM teachers in elementary and secondary education. UWA gateway courses in mathematics and biology reflect the need to improve the secondary foundation of Black American Students.  All freshmen students are required to complete Biology 101 and Math 113.  Of the students entering UWA, 21% are required to take remedial math courses.  The passage rate of these courses is 80%.  The passage rate for Biology 101 is 80%.  The number of students electing to take Biology 102 is 41% and Mathematics 114 is 37%. (UWA, Office of Institutional Effectiveness, 2008-2009, 2009-2010.) The College of Education maintains the largest enrollment on the UWA campus with a total of 2,969 graduate and undergraduate students, or 61% of total enrollment. Of this number, 51% are Black American. The university has long been known as a leader in teacher education with NCATE and SACS accreditation. The College of Natural Science and Mathematics has a total enrollment of 538 with 229 (43%) Black American. In the six primary counties there are 19 secondary schools with 822 teachers. Of this total, 164 are math and science teachers. Of the total number of teachers, approximately 32% have degrees from UWA. The COE graduates an average of 98 certified teachers each year with a 92% placement rate in teaching positions. Of the 98 teachers graduating, 18-21 are science and mathematics majors. Based on the demand within our six primary counties, there is a need for math and science teachers which indicates that school systems are forced to fill classrooms with unqualified teachers or teachers teaching out of field. To meet this need, GREAT MINDS will create and utilize an international consortium to develop a synergistic relationship among stakeholders for the identification, creation and dissemination of best practices in the areas of science, technology, engineering and mathematics curricula throughout the education process.

Lack of Training for STEM Teachers in the Black Belt

The Black Belt Region lacks highly certified teachers and has extreme shortages in Math and Science as validated by non-certified teachers in classrooms. Often teachers lack the skills to illicit critical thinking and problem solving from their students simply because this has not been modeled or practiced by them. The GREAT MINDS project focuses on training both pre-service and service teachers in critical thinking and problem solving skills and on producing teachers who have both the content knowledge and the skills to infuse that content with hands-on learning experiences in the areas of STEM education.

Based on more than 30 years of research on effective schools, the science behind the practice of quality education has begun to materialize and can provide quality direction toward improving student achievement. Marzano’s (2003) research informs us that a student who scores at the 40th percentile who remains for two years in an average performing school, coupled with an average performing teacher, is likely to maintain his/her performance level at the 50th percentile. However, the same student who spends two years in a “most effective” school coupled with a “most effective” teacher soars to the 96th achievement percentile. On the contrary, when the same student remains two years in a “least effective” school with a “least effective” teacher, the student’s achievement level plummets to the third percentile. In addition, effective school leadership that is aware of research-based practices which impact student achievement is critical to effective change. The GREAT MINDS project is dedicated to building the capacity of building-level administrators by providing training for school leaders in both instructional and administrative areas which support effective STEM teaching and learning processes that improve student achievement.

This research substantiates the urgent need for the GREAT MINDS project in the Black Belt. The GREAT MINDS project proposes the first step in developing effective teaching through quality teacher preparation programs that equip teachers and school leaders with expertise in content and research-based instructional strategies. Integration of these strategies into current classroom practice has the potential to help students expand their understanding and proficiency (Marzano, Pickering, & Pollock, 2001). Comprehensive, meaningful, quality, job-embedded professional development is the foremost method for improving the knowledge and skills critical to developing and maintaining teacher effectiveness. The GREAT MINDS project will provide teachers and school leaders with professional development that provides opportunities for them to practice new strategies in a supportive and nurturing environment.

By comprehensively addressing effective teaching and effective leadership through research-based professional learning, the GREAT MINDS project will provide schools within the Black Belt Region with the resources and support needed to attain high standards which impact greater levels of student growth and achievement.

Understanding and Promotion of STEM Subjects

Freshmen entering UWA do not have the experience at secondary or elementary levels to select teacher education as a career choice. Students entering UWA do not have positive attitudes about education due to the schools they attended. Students need to be motivated to choose teacher education early to assure adequate preparation and success. In 2009, the College of Education had an enrollment of 876 on campus graduate and undergraduate students (66% Black American), and an online enrollment of 2,497 (50% Black American) making it the largest college on campus. Of this number, 66% choose teacher education as a secondary choice during and after their sophomore year. Entering students from the Black Belt have not been exposed to technology as a teaching/learning tool. Students come to UWA without knowledge or experience in the use of technology and up-to-date pedagogy because the schools in their communities are poor with inadequate funding and accessibility to internet. Teachers in the rural areas of Alabama have little knowledge of the new teaching methodology resulting from technology.

To help address and correct teachers’ and students’ problems of poor exposure to technology and poor critical thinking skills, a STEM summer enrichment program will be held which will include two distinct phases. Phase 1 will be a week-long summer camp for the professional development of current service teachers and pre-service teachers in the teacher education program in order to train them to incorporate critical thinking and problem solving skills in the classroom and to ensure a solid foundation in hands-on STEM activities. Phase 2, STEM camp, will be for students of all grade levels (P-12), taught by the service teachers, and assisted by the pre-service teachers (trained in Phase 1) in conjunction with UWA College of Education faculty, Presidential Awardees for Math and Science Teaching, and members of the professional community.

Student Retention

The GREAT MINDS project will recruit high needs students from the local service area for the teacher education program and aspires to retain these at-risk students through mentoring and service learning. Of the total enrollment at UWA in 2009 (5,157), 61% are first generation Black American students with a graduation rate of 25%. Of those students, 578 were enrolled in teacher education with the retention rate of 53%. The typical student in the targeted area lives below poverty and based on the FAFSA is needy and disadvantaged.

To increase and retain the enrollment of Black Americans in the teacher education program, the GREAT MINDS project proposes the creation of a teacher preparation classroom. The proposed classroom will be equipped with current and emerging technologies such as an LCD projector, Internet capabilities, a Promethean Board and other current and emerging multi-media resources which infuse technology into the teaching and learning opportunities of teacher education programs. Therefore, technology infused best practices can be modeled and students can have access to the supplies and equipment needed to gain experience and confidence in teaching in a manner that fosters exploration, creativity and discovery.

Marzano, R. J. (2003). What works in schools: Translating research into action. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). Classroom instruction that works: Research-based strategies for increasing student achievement. Alexandria, VA: Association for Supervision and Curriculum Development.